

# THE SCIENCE OF LOGIC

Clarity of Thought Leads to Clarity in Action, Achievement, and Fulfillment

## Wholeness of the Lecture

The study of logic sharpens the intellect. A sharp intellect allows an individual to study knowledge with great precision and accuracy, and to express his/her thoughts effectively. This skill is ultimately fulfilled in higher states of consciousness, when one's intellect is established in pure, unbounded silence, and the expression of one's thoughts is spontaneously in tune with all the laws of nature.

## Main Points

1. **FORMAL LOGIC:** Originally developed by the Greek philosopher Aristotle, the science of formal logic describes all possible types of deductive arguments, and lays out the exact components, structure, and sequence that each type must follow in order to be deemed valid according to the laws of logic. Likewise, in the Vedic Literature, the Vedic sounds flow in a precise structure and sequence in accord with the laws of nature.

2. **INFORMAL LOGIC:** The more recent field of informal logic studies the validity of arguments according to their content alone, regardless of structure. This means each argument must be carefully considered within its larger context, since it could be valid in one context but prove invalid, or debatable, in another. Maharishi's Science of Consciousness provides a systematic framework for understanding and directly experiencing the largest, context of all—the field of pure consciousness at the source of thought and of all relative phenomena, which contains all relative contexts within itself in potential form.

3. **VEDIC LOGIC:** *Nyaya*, the Vedic science of logic and reasoning, describes 16 steps for evaluating knowledge, most of which are similar to western approaches to logic. However, these steps are presented within a context of wholeness. The first Nyaya sutra, *Prama na prameya*, is an expression of the state of supreme balance at the most fundamental level of life, where opposites coexist in harmony.

## Unity Chart

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

### Logical Thinking is Clear Thinking

1. Surface level: A clear mind is capable of thinking logically and understanding clearly.
2. Deeper level: A clear mind is capable of making powerful discriminations in logical thinking, and therefore grasping ever finer implications within ever larger contexts.
3. Transcendental Consciousness is the context of universality—the unbounded field of pure consciousness at the source of all thoughts and of all relative phenomena.
4. Impulses within the Transcendental Field: Contained within the field of pure consciousness are the finest impulses of creative intelligence, which can be accessed by a mind that is clear, logical, and deep.
5. Wholeness moving within itself: In Unity Consciousness—the highest level of human evolution, all areas of life are known as intimately familiar aspects of one's own unbounded Self. In that state, every thought is clear, profound, and naturally aligned with the deepest level of functioning of all the laws of nature.



## 1. FORMAL LOGIC

### ARISTOTLE

Aristotle (Ancient Greek: Ἀριστοτέλης), 384 BC – 322 BC, was a Greek philosopher who is considered one of the founding fathers of western knowledge and civilization. Aristotle was trained in medicine and appointed court physician to the Macedonian royal family, before he became a student of Plato. His prolific work covers a wide range of subjects in the arts, sciences, and humanities — from biology and physics to government and politics, from music and linguistics to ethics and aesthetics. Aristotle created comprehensive systems for the study of philosophy and science, which became highly influential to both Christian and Islamic thought, and which have continued to shape academic disciplines for over 2000 years, up to today. Aristotle also formulated one of the oldest systematic approaches to the field of logic.

Aristotle described three means of rhetorical persuasion: *ethos*—appeal based on the speaker’s own moral character and worthiness, *pathos*—appeal to the audience’s emotions, and *logos*—appeal to logic.

Within the study of logic, Aristotle formalized a system for determining the components of arguments, and all the possible ways they relate to each other. He then derived rules by which the validity of an argument can be determined entirely by its sequence and structure, without concern for the content of the premises.

The structure of such an argument is called a *syllogism*. Each sentence of a syllogism must contain a subject and a predicate, and must either affirm or deny the predicate of the subject. The conclusion of the argument must result in either an affirmation or denial. (Note: A fundamental principle in Aristotle's metaphysics holds that contradictory statements cannot be simultaneously true.) We won’t be studying the structure of formal logic in this class, but we’ll look at examples of three types of formal arguments and fallacies.

### SYLLOGISMS

A syllogism is a formal logical argument consisting of three terms — a major premise, a minor premise, and a conclusion. A **conditional syllogism**, such as the one below, uses the format If A, then B:

Major premise:	<i>If it rains, the streets are wet.</i>	<i>If Joe eats cake, he gets ill.</i>
Minor premise:	<i>The streets are not wet.</i>	<i>Joe is not ill.</i>
Conclusion:	<i>Therefore it is not raining.</i>	<i>Therefore Joe did not eat cake.</i>

A **disjunctive syllogism** uses an either/or format: Either A is true or B is true, but A and B cannot both be true:

Major premise:	<i>Either the breach is a safety violation, or it is not subject to fines.</i>
Minor premise:	<i>The breach is not a safety violation.</i>
Conclusion:	<i>Therefore it is not subject to fines.</i>

Other example: *We’ve narrowed the problem to two possibilities: either the fiber optic cable is broken somewhere or the intermediate amplifier doesn’t work. But I’ve just checked the intermediate amplifier, and it works fine. Therefore, the cable must be broken somewhere.*

**Categorical syllogisms** describe the distribution of members of terms according to categories. There are four possible propositions in a categorical syllogism:

	<i>Affirmation</i>	<i>Denial</i>
<i>Universal</i>	All A are B	No A are B
<i>Particular</i>	Some A are B	Some A are not B

Examples:

*All men are mortal. Socrates is a man. Therefore Socrates is mortal.*

*No fish are mammals. All whales are mammals. Therefore no whales are fish.*

*All behaviors can change. Some behaviors are criminal. Therefore all criminal behaviors can change.*



## FALLACIES OF FORMAL LOGIC – EXAMPLES

(HINT: When in doubt, try substituting different content for one of the premises.)

### Categorical:

*Cool people wear sunglasses. I wear sunglasses, so I'm cool.*

(HINT: Try substituting “cool” with “ridiculous” or “blind” or “green-eared”...)

*The thief has a moustache. Joe has a moustache. Therefore Joe is the thief.*

*Joe is a thief, and he has a moustache. Therefore all thieves have a moustache.*

*Joe is a thief, and he has a moustache. So all men with a moustache are thieves.*

### Conditional:

*If it rains, the streets are wet. The streets are wet. Therefore it is raining.*

*If it rains, the streets are wet. It is not raining. Therefore the streets are not wet.*

### Disjunctive:

*Either the battery is dead or something is wrong with the starter. Yes, the battery is dead, so there cannot be anything wrong with the starter.*

*To help lower the deficit, the city has to either raise taxes or cut programs. They already raised taxes, so cutting programs won't help lower the deficit.*

## IDENTIFY THE SYLLOGISMS, SPOT THE FALLACIES (Remember the HINT: substitute)

If trains sounded their horns in Fairfield, there would be major noise pollution. Fairfield has no major noise pollution, so the trains must not be sounding their horns.	
Creative people produce art. Linda produces art, so she must be creative.	
If Sandy eats cake every day, she puts herself at risk for diabetes. Sandy is not eating cake every day, so she is not putting herself at risk for diabetes.	
The Nazis were Germans. Paul was German, so he was a Nazi.	
Either the milk went sour or I'm a terrible cook. The milk did go sour, so that proves I'm a good cook.	
All behaviors can change, but opinions are not behaviors. So, opinions can't change.	
Germany decided to either rebuild its aging nuclear power plants, or phase out its entire nuclear energy program. Germany is not rebuilding its aging power plants, so Germany's nuclear energy program is being phased out.	

## TRUTH, VALIDITY, SOUNDNESS

### True/false premise:

A premise is considered **true** if it is making a true statement: *All fish can swim.*

A premise is considered **false** if it is making a false statement: *All whales are fish.*

### Valid/invalid argument:

A logical argument is **valid** if its logic is without flaws. This is irrespective of the truth of the premises. So, an argument can be valid even if not all of its premises are true.

In the example below, the major premise is false, yet the argument is considered logically valid:

*All whales are fish. All fish live in water. Therefore all whales live in water.*

In this example, the minor premise is false, leading to a false conclusion, yet the argument is valid:

*All whales are mammals. Some whales are fish. Therefore some fish are mammals.*

Conversely, an **invalid** argument could have all true statements, as in the following example:

*All whales are animals. All fish live in water. Therefore all whales live in water.*

### Sound/unsound argument:

A **sound** argument must have **true** premises, and its conclusion must be based on **valid** logic:

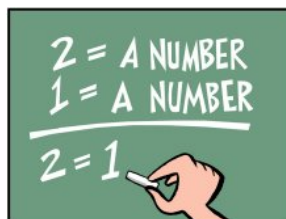
*All salmon are fish. All fish live in water. Therefore all salmon live in water.*

An argument is **unsound** if either the logic is invalid, or one or more of its premises are false.

## TRUE/FALSE, VALID/INVALID, SOUND/UNSOUND

Circle the answers:

Educated people always use long, complicated sentences. I always use long, complicated sentences. Therefore I am educated.	M premise: T / F m premise: T / F Argument: V / I • S / U
Gold is a precious metal. Some precious metals are shiny. Therefore gold is shiny.	M premise: T / F m premise: T / F Argument: V / I • S / U
If Olympic runners smoked, they would be unhealthy. Olympic runners are healthy. Therefore Olympic runners don't smoke.	M premise: T / F m premise: T / F Argument: V / I • S / U



## DEDUCTIVE AND INDUCTIVE ARGUMENTS

Most of the arguments we studied so far are **deductive** arguments. A deductive argument is an argument whose premises establish a conclusion **without doubt**. Formal deductive arguments can be evaluated for their soundness according to the criteria described above. The argument below is sound:

*All swans in this zoological garden are white. Harold is one of their swans, so he must be white.*

An **inductive** argument is an argument whose premises establish a conclusion that is **probably** true. The logic of such arguments is technically considered invalid, but if their premises are true, inductive arguments can be evaluated as either strong or weak, according to the likelihood of their truth.

Strong inductive argument:

*Julia dropped her glove either in the car or on the street. We carefully searched the entire car but couldn't find the glove. So, the glove was probably dropped on the street.*

Weak inductive argument (note that this argument does not follow the structure of formal logic):

*All swans in this zoological garden are white. Therefore, all swans are probably white.*

Strong inductive argument:

*All of the hundreds of thousands of swans observed thus far over hundreds of years in all parts of the world have been white. Therefore, all swans are probably white.*

Note: The discovery of black swans shows that even very strong inductive arguments, such as the one above often cited, can turn out not to be true.

## INDUCTIVE ARGUMENTS: STRONG OR WEAK?

I once owned a Chevy that was a lemon. Now, I don't trust Chevys because many of them are probably bad.	S / W
I met two door-to-door salesmen who were using lots of loaded questions to get me to agree with them and buy their products. All door-to-door salesmen use loaded questions just like that.	S / W
I've eaten French Fries half a dozen times at this restaurant, and each time I've ended up with indigestion. My indigestion is probably related to those fries, and I won't order them any more.	S / W
Either it's too hot in here, or my pitta is aggravated. It's indeed too hot in here, so my pitta is not aggravated.	S / W

## BRAIN TEASERS

This sentence contains a statement which is not true.

Logic is a discipline that cannot be proven false. Any attempt to disprove the existence of logic would require the use of logic, thereby proving that logic does exist.

## 2. INFORMAL LOGIC

Logicians find that many arguments in everyday situations—both deductive and inductive—cannot be readily restated according to the structure of formal logic, and are therefore difficult or impossible to evaluate on that basis. The more recent field of informal logic studies the validity of arguments according to their content alone, regardless of structure. This means each argument must be carefully considered **within its larger context**, since it could be valid in one context but prove invalid, or debatable, in another.

### **LATIN TERMS YOU NEED TO KNOW**

<i>ad</i>	- at, toward	<i>non</i>	- not	Vowel pronunciation: a – <u>a</u> re e – <u>th</u> ere o – <u>m</u> ore u – <u>Zu</u> lu i – <u>ki</u> wis
<i>cum</i>	- with	<i>post</i>	- after	
<i>ergo</i>	- therefore	<i>propter</i>	- because of	
<i>hoc</i>	- this (issue at hand)	<i>quoque</i>	- also	
<i>homo</i>	- person, man, human being	<i>tu</i>	- you	
<i>hominem</i>	- person (in the direction of)	<i>sequitur</i>	- it follows	

### **FALLACIES OF INFORMAL LOGIC – EXAMPLES**

Below is a list of common categories of fallacies. Note that some arguments may fit into more than one category.

FALLACIES OF PRESUMPTION contain false premises and so fail to establish their conclusion – *non sequitur*.

**Non sequitur** example:

*People do better on logic tests after listening to Mozart. So, listen to Mozart before your tennis match.*

**Hasty generalization** makes a logical jump to derive a general rule from a particular instance:

*I met a New Yorker who was very smart, so I know that all New Yorkers are very smart.*

**Sweeping generalization** applies a general rule too broadly to a particular instance:

*I have a right to free speech, so I have a right to play my kazoo at the movie theater during the show.*

**Fallacy of composition** confuses truth about the parts with truth about the whole:

*Sap is colorless. Roses are made of sap, so roses are colorless.*

**Fallacy of division** confuses truth about the whole with truth about the parts:

*The rose is red. The rose is made of sap, therefore its sap is red.*

**Circular reasoning** restates the premise as the conclusion, making the conclusion beg the question:

*Objects which are less dense than water will float, because they won't sink in water.*

*You can't give me a C, because I'm an A student.*

**"No true Scotsman"** is a particular form of circular reasoning:

*No true Scotsman puts sugar on his porridge. If a Scotsman ever does that, he is not a true Scotsman.*

**Cum hoc, ergo propter hoc** (false cause) confuses simultaneous correlation with causality:

*Every time the rooster crows, the sun rises. Therefore the rooster causes the sun to rise.*

**Post hoc, ergo propter hoc** (false cause) confuses temporal succession with causality:

*Last, week Jim bleached his hair blonde. This week, John did the same. So, John did it to copy Jim.*

**Slippery slope** assumes that one thing must lead to a chain of other events:

*If we ban smoking, then people will start taking soft drugs and then move onto hard drugs, and the crime rate will go up. We should therefore prevent crime by allowing smoking.*

**False dilemma** restricts an argument to an either/or choice:

*You didn't buy that ipod, so you'll have to go without music for a while.*

**Argument from Ignorance** assumes a claim is true because it has not been proven false, or vice versa:

*No one has ever convincingly proven that U.F.O.s exist; therefore, they don't.*

*No one has ever convincingly proven that U.F.O.s don't exist; therefore, they do.*

**Fallacist's fallacy** assumes that, if an argument contains a fallacy, the conclusion must be false:

*Dan is wearing his green socks while re-taking the test, to improve his score. This reasoning is a red herring fallacy; therefore his score won't improve.*

FALLACIES OF RELEVANCE or *red herrings* use premises not relevant to the truth of the conclusion.

**Red herring:**

*Tim would be a good student body president. I can tell by his cool, up-to-date dress style!*

**Tu quoque** assumes that two wrongs make a right; "I may be wrong, but so are you":

*The government steals from people, therefore it's okay for me to cheat on my income tax return.*

**Ad hominem** is a red herring that diverts from the argument with a personal attack:

*What you say is not true. I see that you're not used to thinking logically.*

**Poisoning the well** commits a 'pre-emptive strike' against potential opposing arguments:

*That's my stance on funding public education, and anyone who disagrees with me hates children.*

**Loaded question** (not an argument) tempts the audience to commit a fallacy – often an ad hominem, false dilemma, or both:

*Why would anyone want to buy a product from a person who got three speeding tickets in a month?*

*You don't want to go to the movies tonight, so are you antisocial?*

**Irrelevant appeals** argue on the basis of **consequences**, **popularity**, **law**, **tradition**, **money**, **looks**, etc.:

- **Appeal to Consequences**: *God must exist, because otherwise, life would be meaningless.*
- **Bandwagon Appeal**: *I started smoking because everyone else was smoking, too.*
- **Appeal to Reward**: *This pesticide must be harmless to my crops because I get subsidies for using it.*
- **False Analogy**: *Employees are like nails. You must hit them on the head in order to make them work.*
- **Appeal to False Authority**: *My doctor says this stock will rise. He's a good doctor, so I believe him.*
- **Argument by Association**: *Sue got a prestigious scholarship, so her sister must be very bright, too.*
- **Association – the Hitler Card**: *You know who else did X? Hitler! So, X must be a bad thing.*
- **Appeal to Emotion**: *Don't jail that poor man for theft. He lost his parents as a kid and has a hard life!*
- **Appeal to Novelty**: *The most recent study supports this theory. It's the most recent study that counts.*

FALLACIES OF AMBIGUITY manipulate the argument.

**Straw man** attacks a misrepresentation or caricature (straw man) of the position:

*Living in Iowa is boring because that state has nothing but corn and pigs and straw men.*

**Equivocation** uses language in ambiguous ways:

*Yes, I studied last night (but by 'study' I mean speed-read the text once).*

*You would be lucky to get her to work for you.*

## IDENTIFY THE INFORMAL FALLACIES

I forgot my umbrella; that's why it's raining today.	
Burritos are better than nothing. Nothing is better than pizza. Therefore, burritos are better than pizza.	
I took some vitamins and then got sick. So the vitamins made me sick.	
Hollywood signs Jackie Chan to play lead roles because he is a Hollywood star.	
If you restrict my right to say whatever I want, anywhere I want, however I want, this is the beginning of totalitarianism in America.	
"I trust Snape because Dumbledore trusts him."—(Remus Lupin in Harry Potter)	
Since the class has no questions about this topic, you must be ready for a test.	
No real cat-lover would ever consider feeding their cat vegetables.	
Mark Twain was born in 1835, and died in 1910. Both events occurred within days of Halley's comet passing over the Earth. This can't be a coincidence.	
Sodium and chloride are poisons. Therefore sodium chloride must be poisonous.	
You can't prove that you didn't eat the cookies, so you must have eaten them.	
My doctor says I should drink 6 glasses of water per day to stay healthy. Since soda is a liquid like water, I will drink 6 glasses of soda per day to stay healthy.	
This argument's premises are true. Therefore the whole argument must be valid.	
We can't jail the bank's CEO for corruption, because the bank would collapse.	
I think raising our application standards has merit. I recommend that you support it, too. After all, we're in a budget crisis and we don't want our salaries affected.	
Buy Skunk brand perfume; you will stand out from the crowd.	
Classical music is old stuff played by old people, so I don't listen to it.	
Either you support the President's position or you are not a patriotic American.	
The five subjects in our experiment responded well to our intervention. We can therefore recommend the procedure to everyone.	
What makes that song popular is the fact that everyone likes it so much.	
Look who's talking!	
In Spain, bull fighting cannot be outlawed on the basis of cruelty to animals, because it has existed for centuries and is an important part of Spanish culture.	
Stalin was an atheist—proof that atheism leads to extreme human rights abuse.	
Hurry, because today you can get <i>two</i> pizzas for <i>one</i> special price!	
"He uses statistics as a drunken man uses lamp-posts — for support rather than illumination." —Andrew Lang	
Is light a wave, or is light composed of particles?	
If you get a dog, pretty soon your neighborhood will be full of barking dogs.	
Chemistry states that water boils at 100°C, but that is not true at high altitudes. Therefore chemistry is wrong.	
This soap is like a dream. It lifts you and gives you the sensation of flying.	
God exists because the scriptures say so, and scriptures are divinely inspired.	
Are you going to listen to Wagner, even though it was Hitler's favorite music?	
Mary believes the stock market will rise because she needs money. This is a fallacious appeal to consequences. Therefore, the market will not rise.	
It's no big deal that the Senator told a lie. Other politicians do far worse things!	
"People who eat Shredded Wheat tend to have healthy hearts." —Nestlé	
Kindergarten students at MSAE did better when given milk and cookies in class; so let's give milk and cookies to MUM students in class, and they will do better.	



## THE NEED FOR CONTEXT

Below are arguments that resemble the informal fallacies above, yet their context makes them debatable or even reasonable. Discuss them with your neighbor. Can you think of other examples?

*In the American legal system, a criminal defendant is considered legally innocent unless proven guilty beyond reasonable doubt.*

*On six different occasions I tried a bottle of ginger ale and found it bitter. Probably I would find every bottle of ginger ale bitter.*

*In Karate class, students must bow to the master, say "Yes, sir!" to every command, and obey without questioning, because that's the Karate tradition.*

*I married this man, therefore he is the best husband in the world. I choose to think this way and treat him this way, because it keeps us happy and keeps our marriage strong.*

## REAL WORLD LOGICAL ARGUMENTS AND FALLACIES: IDENTIFY

*(Note that not all are fallacies. Also note that some authors use wit or sarcasm to point out fallacies.)*

We hated the war, but we loved it too. Vietnam made us special, a generation with a mission. Vietnam gave the semblance of moral shape to what was actually a formless hatred of "the system." The war justified every excess, every violent thought and deed. Heaving a rock at some corporation's window, we banished guilt by the thought: This is for the Vietnamese. Trying to set fire to a university library, we said to ourselves: This is for the Vietnamese. If the war gave us license, it also gave us an addictive sense of moral superiority: we were better than the circumstances in which we were forced to live. If we committed small misdemeanors of indecency, they were in the long run justified by the much larger and more obscene crime in Southeast Asia.

*Source: Peter Collier, "Something Happened to Me Yesterday", in Destructive Generation: Second Thoughts About the Sixties, with David Horowitz (Summit Books, 1989), p. 264.*

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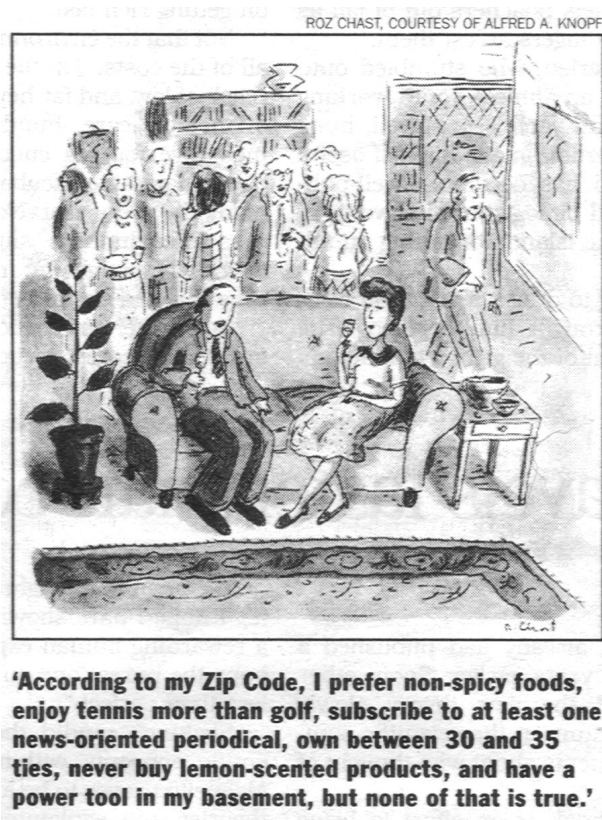
"It was at this point that the dim beginnings of a philosophy began to invade her mind. The thing resolved itself almost into an equation. If father had not had indigestion he would not have bullied her. But, if father had not made a fortune, he would not have had indigestion. Therefore, if father had not made a fortune, he would not have bullied her. Practically, in fact, if father did not bully her, he would not be rich. And, if he were not rich . . . She took in the faded carpet, the stained wall-paper, and the soiled curtains with a comprehensive glance. . . . It certainly cut both ways. She began to be a little ashamed of her misery."

*Source: (P.G. Wodehouse, Something Fresh, 1915)*

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Gerda Reith is convinced that superstition can be a positive force. "It gives you a sense of control by making you think you can work out what's going to happen next," she says. "And it also makes you feel lucky. And to take a risk or to enter into a chancy situation, you really have to believe in your own luck. In that sense, it's a very useful way of thinking, because the alternative is fatalism, which is to say, 'Oh, there's nothing I can do.' At least superstition makes people do things."

*Source: David Newnham, "Hostages to Fortune"*



The case of the ecologist who linked the cycles of the Canadian lynx and its prey, the snowshoe rabbit, with the sunspot cycle is instructive. The ecologist analyzed records of the Hudson Bay Company, which had been collecting pelts of the two species since 1735; he found that the two populations fluctuated up and down, displaying a periodicity of approximately ten years. Not surprisingly, the variations in the predatory lynx population tended to follow the ups and downs in the rabbit population with a time lag of a couple of years.

Then the ecologist superimposed the two curves atop a similar graph representing the concurrent sunspot activity: voilà! The three cycles approximately coincided over a good portion of their range. The ecologist leaped to the conclusion that the annual fluctuations of the lynx and rabbit populations were controlled by the eleven-year sunspot cycle....

Source: Lawrence E. Jerome, "Astrology: Magic or Science?", in *Objections to Astrology* by Bart J. Bok & Lawrence E. Jerome (Prometheus, 1975), p. 57.

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Four out of five dentists use Crest toothpaste.

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Our military operation in Panama was not, I repeat not, an invasion. That would violate the national sovereignty of one of our strongest friends and allies. "Operation Just Cause" was simply the result of my directing our armed forces to protect the lives of American citizens in Panama, to execute pre-planned missions in Panama, to conduct efforts to support the democratic processes in Panama, and to assure the integrity of the Panama Canal while creating an environment safe for American citizens. (based on quotes from a[n] ... American President)

Source: <http://www.drury.edu/ess/logic/informal/Equivocation.html>

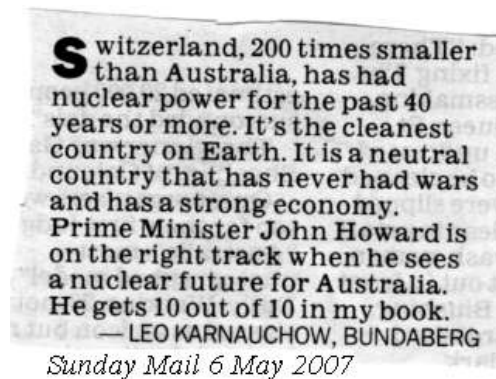
LOGIC, n. The art of thinking and reasoning in strict accordance with the limitations and incapacities of the human misunderstanding. The basis of logic is the syllogism, consisting of a major and a minor premise and a conclusion--thus:

Major Premise: Sixty men can do a piece of work sixty times as quickly as one man.

Minor Premise: One man can dig a posthole in sixty seconds; therefore--

Conclusion: Sixty men can dig a posthole in one second. This may be called the syllogism arithmetical, in which, by combining logic and mathematics, we obtain a double certainty and are twice blessed."

(Ambrose Bierce, *The Devil's Dictionary*)



*Dr. House:* Words have set meanings for a reason. If you see an animal like Bill and you try to play fetch, Bill's going to eat you, because Bill's a bear.

*Little Girl:* Bill has fur, four legs, and a collar. He's a dog.

*Dr. House:* You see, that's what's called a faulty syllogism; just because you call Bill a dog doesn't mean that he is . . . a dog.

("Merry Little Christmas," *House, M.D.*)

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Timon: I have forgot all men;

Then, if thou grant'st thou'rt a man, I have forgot thee.

*William Shakespeare, Timon of Athens, Act Four, scene 3*

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Among the various celebrity-endorsed items being advertised inside Madison Square Garden on a recent Sunday afternoon were the following: . . . one candidate for president of the United States—Bill Bradley, endorsed by some two dozen retired basketball legends, four Hollywood actors, one tempestuous former tennis star, and one R&B singer.

. . . Surely John Sweeney's recommendation of a presidential candidate carries more weight than Dr. J's. After all, does Jim Palmer's low ERA really make him a reliable guide to home mortgages?

Well, yes—at least according to the associative logic that drives this country's multimillion-dollar celebrity-endorsement industry. If Pete Sampras shills for Pizza Hut, then their pizza must be the best. And if a champion athlete is possessed of certain ineffable qualities—grit, say, or sportsmanship—and that athlete happens to speak fondly of a certain Lean Mean Fat-Grilling Machine, then the Lean Mean Fat-Grilling Machine must also be imbued with the fat-grilling equivalent of grit and sportsmanship.

. . . If we pick our presidents in much the same way that we pick our underwear, then Michael Jordan's preference for Bill Bradley is precisely as relevant as his preference for Hanes.

*Source: Nicholas Confessore, The American Prospect, December 20, 1999, pp. 24-5.*

Our universe, however, did begin with the primordial explosion, since we can obtain no information about events that occurred before it. The age of the universe, therefore, is the interval from the big bang to the present.

Source: *Scientific American*

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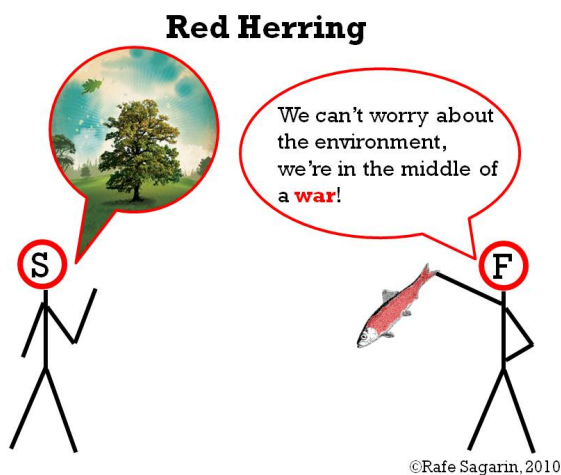
In all matters of opinion, our adversaries are deranged.

—Mark Twain

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...[T]he acceptance of abortion does not end with the killing of unborn human life. It continues on to affect our attitude toward all aspects of human life. This is most obvious in how quickly, following the acceptance of abortion, comes the acceptance of infanticide—the killing of babies who after birth do not come up to someone's standard of life worthy to be lived—and then on to euthanasia of the aged. If human life can be taken before birth, there is no logical reason why human life cannot be taken after birth.

Source: Francis A. Schaeffer, "It is Your Life that is Involved", *Who is For Life?* (1984), p. 39.



One of the most powerful ideas in advertising is the idea that everyone is doing it. Whether you're looking for a holiday destination, buying a mobile phone, or just choosing a new CD, most people are more likely to get out their wallets if they think that other people are doing the same.

This is one reason why Amazon has those 'X% of people who viewed this bought this' boxes. This is more than just cross-promotion, more than just suggesting products related to the one that you've shown an interest in; it's a subtle endorsement of the decision to buy, appealing to the fact that lots of other people have done the same. "How could it be a mistake when so many people have done it?" Or, to make the old trope unmistakable, "Millions can't be wrong".

Persuasive though this train of thought can be, it lacks logical rigour. Popular decisions can be mistakes; millions can be wrong. And if X% of people have messed up and bought rubbish, then you wouldn't want to join them.

Source: <http://www.logicalfallacies.info/people-who-viewed-this-product-bought-thi/>

[The Mayor] said the biggest problem for the city administration has been fighting people who have protested such things as industrial development. "We've had people fight highways, the school corporation and county zoning," he said. "I didn't notice any of these people coming up here on horses and donkeys. They all drove cars up here, spewing hydrocarbons all over the place."

*Source: Terre Haute Tribune-Star*

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Fiendish difficulty: Check this text one sentence at a time for fallacies/valid statements:

How long have you been sitting in front of the television getting fat and lazy? Wouldn't you like to find a means of exercise that will shape your body while you are reading, watching television, or otherwise occupying your time? The solution is here, the Thigh-master 5000. Purchase a Thigh-master 5000 today! Actor Tim Allen has recommended the thigh-master to all of his viewers. He can tell you all the facts. For one, the Thigh-master 5000 is one of the best designed exercise machines on the market. Our machine will last nearly forever and is practically indestructible! It is built out of a duraluminum polyalloy that is less expensive than other commonly used materials, but it is as strong as steel. The pseudo-leather cover is soft to the touch and shapes itself to your body, so you'll find it more comfortable than any other leg-working machine. Either you will find that our price to be lower than any other product available, or we will refund your money if you find a better price! Our competitor, the Leg-o-matic company, does offer a life-time warranty for their product. But do you really want to purchase products from a company that had lawsuits last year concerning customer safety? Obviously they do not have the same commitment to their products that we do to ours, and therefore our product is thus superior to theirs. So get with our program! Either you can spend \$45 and be in better shape than ever, or you can remain a couch potato. Purchase the Thigh-master 5000 today.

*Source: [http://web.cn.edu/kwheeler/Logic\\_Fallacies\\_Exercise.html](http://web.cn.edu/kwheeler/Logic_Fallacies_Exercise.html)*

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### The Southern Argument for Slavery

Those who defended slavery rose to the challenge set forth by the Abolitionists. The defenders of slavery included economics, history, religion, legality, social good, and even humanitarianism, to further their arguments.

Defenders of slavery argued that the sudden end to the slave economy would have had a profound and killing economic impact in the South where reliance on slave labor was the foundation of their economy. The cotton economy would collapse. The tobacco crop would dry in the fields. Rice would cease being profitable.

Defenders of slavery argued that if all the slaves were freed, there would be widespread unemployment and chaos. This would lead to uprisings, bloodshed, and anarchy. They pointed to the mob's "rule of terror" during the French Revolution and argued for the continuation of the status quo, which was providing for affluence and stability for the slaveholding class and for all free people who enjoyed the bounty of the slave society.

Defenders of slavery argued that slavery had existed throughout history and was the natural state of mankind. The Greeks had slaves, the Romans had slaves, and the English had slavery until very recently.

Defenders of slavery noted that in the Bible, Abraham had slaves. They point to the Ten Commandments, noting that "Thou shalt not covet thy neighbor's house, ... nor his manservant, nor his maidservant." In the New Testament, Paul returned a runaway slave, Philemon, to his master, and, although slavery was widespread throughout the Roman world, Jesus never spoke out against it.

Defenders of slavery turned to the courts, who had ruled, with the Dred Scott Decision, that all blacks — not just slaves — had no legal standing as persons in our courts — they were property, and the Constitution protected slave-holders' rights to their property.

Defenders of slavery argued that the institution was divine, and that it brought Christianity to the heathen from across the ocean. Slavery was, according to this argument, a good thing for the enslaved. John C. Calhoun said, "Never before has the black race of Central Africa, from the dawn of history to the present day, attained a condition so civilized and so improved, not only physically, but morally and intellectually."

Defenders of slavery argued that by comparison with the poor of Europe and the workers in the Northern states, that slaves were better cared for. They said that their owners would protect and assist them when they were sick and aged, unlike those who, once fired from their work, were left to fend helplessly for themselves.

Source: <http://www.ushistory.org/us/27f.asp>

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Logic is the begining of wisdom, Valeris, not the end.  
—Mr. Spock in *Star Trek VI: The Undiscovered Country*

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### **3. VEDIC LOGIC**

*Nyaya* is the first of 6 systems of Indian philosophy, also called the 6 *Darshanas*. *Nyaya* literally means “justice”. It is the Vedic science of logic and reasoning.

*Nyaya* describes 16 steps for evaluating knowledge, most of which are similar to western approaches to logic (see next page). However, these steps are presented in the context of wholeness. The first sutra of *Nyaya*, *Prama na prameya*, is an expression of the state of supreme balance at the most fundamental level of life, where opposites coexist in harmony.

#### **THE FIRST SUTRA: AN EXPRESSION OF WHOLENESS**

*Prama na prameya*

*Prama* – Knower, Subject, Consciousness

*Prameya* – Known, Object, Matter

*Na* – Not

There are two ways to view this phrase. They are **opposite to each other**, yet both are equally well-founded and **simultaneously valid**:

*Consciousness! Not Matter.* OR *Consciousness Not. Matter!*

In this way, *Nyaya* starts with a universal perspective that unites opposite values into a greater whole.

## 16 STEPS FOR EVALUATING KNOWLEDGE ACCORDING TO NYAYA

### 1. Means of gaining valid knowledge

Consciousness; subjectivity; the knower

Relates to 4 subdivisions of awareness

- Perception
- Inference
- Comparison
- Verbal Testimony

### 2. Objects of valid knowledge

Matter; objectivity; the known

Relates to external sources of information

### 3. Doubt

Questions; possible contradictions: Where there is doubt, there must be ongoing examination

### 4. Purpose

Plan or strategy to resolve doubts

### 5. Examples

### 6. Established principle

Basic laws of nature that support the logic; resting on authority based on hypothesis testing

### 7. Parts of a logical argument

Testing the logical progression:

- Proposition
- Reason
- Example
- Application
- Conclusion

### 8. Process of reasoning

Tracing the sequence of logic that is used to structure an argument

### 9. Art of drawing conclusions

Evaluating the soundness of the conclusion that is drawn

### 10. Discussion

Assessing aspects of an argument from different angles; the interplay of two opposing sides for the purpose of arriving at a decisive conclusion for the sake of knowledge

### 11. Polemics

Arguments for the sake of victory, not for the sake of truth

### 12. Cavil

That which lowers the dignity of others

### 13. Fallacies — 5 types of inadequate reasoning:

- Inconclusive (more than one conclusion can be drawn from an argument)
- Contradictory (points that contradict each other)
- Equivalent to the Question (circular reasoning)
- Unproved (there are no precedents to support the thesis)
- Belated (not workable in the present time frame)

### 14. Equivocation

Use of vague, ambiguous, or misleading language

### 15. Futile arguments

Arguments based on similar and dissimilar characteristics

### 16. Disagreement on first principle

Arguments based on false premises — ideas that do not reflect a correct understanding